UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,120	11/28/2001	Kwong-Yu Chan	609920600024	1508

24325 7590 06/22/2006

STEPHEN D. SCANLON
JONES DAY
901 LAKESIDE AVENUE
CLEVELAND, OH 44114

EXAMINER	
WONG, EDNA	

ART UNIT	PAPER NUMBER
1753	

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/996,120	CHAN ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,7-23,26-31 and 33-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,7-23,26-31 and 33-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *See "Other"*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *March 5, 2002 and June 4, 2002*.

Claim Rejections - 35 USC § 112

Claims **12, 26-28 and 38** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12

line 2, "Sn" is indefinite.

Claim 26

line 3, "PTE" is indefinite.

Claim 38

line 2, "Sn" is indefinite.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

I. Claims **1-2, 9 and 11-12** are rejected under 35 U.S.C. 102(b) as being anticipated by **Katsoulis et al.** (US Patent No. 3,668,014).

Katsoulis teaches a method for catalytically oxidizing organic molecules

comprising:

(a) passing a solution containing organic molecules (= an electrolyte of alkanol amines) [col. 6, lines 10-20] over a catalyst (= an electrocatalyst) [col. 3, lines 1-12] to catalyze the oxidation of the organic molecules in the solution (= to engage in an *oxidation* or reduction half-reaction with an electrolyte) [col. 1, lines 27-30], said catalyst comprising a discrete mixture of platinum particles and cobalt particles (col. 3, lines 1-12).

The catalyst is supported on an electrode (= introducing an activated catalytic metal into a fibrous polyhalohydrocarbon matrix and disposing of the resulting matrix in *an electrode* of an electrochemical cell) [col. 2, lines 33-36].

The catalyst further comprises metal oxides of said cobalt (= the electrocatalyst can be of any of the various materials, including pure elements, alloys, mixtures and *oxides* which will enhance an electrochemical reaction) [col. 3, lines 1-3].

The cobalt is present in an oxidation state of 0, 2, 8/3 or 3 (col. 3, lines 1-12).

The catalyst further comprises Sn in an amount not greater than about 10 atom percent of the total composition (= 0 atom percent).

The catalyst further comprises a mixture of polytetrafluoroethylene (col. 2, lines 46-50).

Since Katsoulis teaches all of the limitations recited in the instant claims, the reference is deemed anticipatory.

II. Claims **4, 14, 19-20 and 23** are rejected under 35 U.S.C. 102(b) as being anticipated by **Katsoulis et al.** (US Patent No. 3,668,014).

Katsoulis teaches a method for catalytically oxidizing organic molecules comprising:

(a) passing a solution containing organic molecules (= an electrolyte of alkanol amines) [col. 6, lines 10-20] over an electrode (= introducing an activated catalytic metal into a fibrous polyhalohydrocarbon matrix and disposing of the resulting matrix in *an electrode* of an electrochemical cell) [col. 2, lines 33-36] to catalyze the oxidation of the organic molecules in the solution (= to engage in an *oxidation* or reduction half-reaction with an electrolyte) [col. 1, lines 27-30], said electrode comprising a discrete mixture of platinum particles and cobalt particles (col. 3, lines 1-12).

The electrode is a metal electrode (= a conductive metal skeleton) [col. 3, line 71 to col. 4, line 4, line 8].

The electrode is an anode in an electrochemical device (= *a fuel* or oxidant electrode in a fuel cell) [col. 1, lines 19-22).

The electrode is part of a fuel cell (= a fuel or oxidant electrode in *a fuel cell*) [col. 1, lines 19-22).

The electrode comprises said mixture coated on a platinum wire (= a conductive metal skeleton, i.e., *a wire*, in contact with the catalytic surface of the fluorocarbon polymer matrix) [col. 3, lines 71-75].

The electrode structure comprises a nickel current collector (col. 4, lines 4-6)

having a coating comprising a mixture of PTFE and said platinum particles and cobalt particles (= in contact with the catalytic surface of the fluorocarbon polymer matrix) [col. 3, lines 71-75].

The nickel current collector is comprised of nickel mesh (col. 3, line 71 to col. 4, line 8).

Since Katsoulis teaches all of the limitations recited in the instant claims, the reference is deemed anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

I. Claims **7-8, 10 and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katsoulis et al.** (US Patent No. 3,668,014) as applied to claims 1-2, 9 and 11-12 above, and further in view of **Nonaka et al.** (US Patent No. 5,536,379), **Richter et al.** (US Patent No. 4,126,934) and **Kanbara et al.** (US Patent No. 5,538,811).

Katsoulis is as applied above and incorporated herein.

The method of Katsoulis differs from the instant invention because Katsoulis does not disclose the following:

a. Wherein said platinum is present in an amount within the range of about 52 to about 99 weight percent of the catalyst, as recited in claim 7.

Katsoulis teaches that in any event, less than the 10-17 mg Pt/cm^2 used in the prior art does not result in any sacrifice of the electrochemical activity with respect to prior art electrodes (col. 3, line 30-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the amount of platinum described by Katsoulis with wherein said platinum is present in an amount within the range of about 52 to about 99 weight percent of the catalyst because it has been held that changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

b. Wherein said cobalt is present in an amount within the range of about 48

to about 1 weight percent of the catalyst, as recited in claim 8.

Katsoulis teaches that the catalyst loading of the finished electrode can be less than half of what has been customary in the prior art and obtain equivalent results, i.e., the catalyst loading will be from 0.5 to 7 mg/cm^2 (col. 3, lines 25-30).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the amount of cobalt described by Katsoulis with wherein said cobalt is present in an amount within the range of about 48 to about 1 weight percent of the catalyst because it has been held that changes in temperature, *concentration* or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

c. Wherein said metal oxides of said cobalt are the products of reactive electrodeposition, as recited in claim 10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the metal oxides of said cobalt described by Katsoulis with wherein said metal oxides of said cobalt are the products of reactive electrodeposition because no difference is seen between an electrolessly deposited metal oxide and an electrodeposited metal oxide. The cobalt oxide (CoO) would have been the same either way.

d. Wherein said catalyst further comprises carbon, as recited in claim 13.

Like Katsoulis, Nonaka teaches a reaction layer of a fuel cell electrode. Nonaka teaches that a conventional gas diffusion electrode generally has three layers, i.e., a uniform water repellant layer for completely separating a gas from a liquid, an electrically conductive porous layer (metal mesh) for supplying an electric current, and a fine reaction layer having a catalyst (col. 1, lines 50-54). Nonaka teaches that the gas diffusion layer and reaction layer can be prepared with a carbon powder or a graphite powder and an aqueous suspension of fluorine resin such as polytetrafluoroethylene (col. 2, lines 55-67; and col. 4, lines 51-59).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the catalyst described by Katsoulis with wherein said catalyst further comprises carbon because a reaction layer of a fuel cell electrode is conventional prepared with carbon powder as taught by Nonaka (col. 2, lines 55-67; and col. 4, lines 51-59).

II. Claims **15-18, 21-22 and 26-28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katsoulis et al.** (US Patent No. 3,668,014) as applied to claims 4, 14, 19-20 and 23 above, and further in view of **Nonaka et al.** (US Patent No. 5,536,379), **Richter et al.** (US Patent No. 4,126,934) and **Kanbara et al.** (US Patent No. 5,538,811).

Katsoulis, Nonaka, Richter and Kanbara are as applied for reasons as discussed above and incorporated herein.

The method of Katsoulis differs from the instant invention because Katsoulis does not disclose the following:

a. Wherein said electrode is a metal foam electrode, as recited in claim 15.

b. Wherein said electrode is a flooded electrode, as recited in claim 18.

c. Wherein said nickel current collector is comprised of nickel foam, as recited in claim 27.

Like Katsoulis, Nonaka teaches a reaction layer of a fuel cell electrode. Nonaka teaches that the electrode current collector is preferably composed of mesh, expanded mesh, *foamed material* or sintered powder of titanium, nickel, stainless steel, etc., or a composite material thereof. When the electrode current collector is a mesh, it is preferred that *the porosity thereof is from 30 to 90%* (col. 3, lines 28-41).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrode described by Katsoulis with wherein said electrode is a metal foam electrode; wherein said electrode is a flooded electrode;

and wherein said nickel current collector is comprised of nickel foam because a foam electrode and a flooded electrode would have easily discharged the liquid permeated from the gas diffusion and reaction layer to the back surface thereof so that gas supplied from the electrode current collector side can easily reach the gas diffusion and reaction layer as taught by Nonaka (col. 3, lines 16-41).

d. Wherein said electrode is a graphite electrode, as recited in claim 16.

e. Wherein said electrode is a porous carbon electrode, as recited in claim 17.

Katsoulis teaches that the current collector must be relatively resistant to the electrolyte employed in the cell and must be a good conductor of electrical current (col. 4, lines 6-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrode described by Katsoulis with wherein said electrode is a graphite electrode and wherein said electrode is a porous carbon electrode because the electrode is a result-effective variable and one skilled in the art has the skill to determined the electrode material dependent upon the electrolyte employed as taught by Katsoulis (col. 4, lines 6-8; and MPEP § 2141.03).

Furthermore, carbon and graphite are commonly used materials in the fuel cell art.

f. Wherein said electrode is part of a reactor used to synthesize gluconic acid, as recited in claim 21.

g. Wherein said electrode is part of a glucose sensor, as recited in claim 22.

Like Katsoulis, Richter teaches a fuel cell electrode. Richter teaches oxidizing glucose with a platinum-cobalt electrode in a bio-fuel cell (col. 7, Example 4; and col. 9, lines 30-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrode described by Katsoulis with wherein said electrode is part of a reactor used to synthesize gluconic acid; and wherein said electrode is part of a glucose sensor because the selection of old parts to operate in new environments in order to achieve the same results was held to have been obvious. *In re Ross* 105 USPQ 237. And the substitution of known equivalent structures was held to have been obvious. *In re Ruff* 118 USPQ 343 (CCPA 1958).

Richter teaches that is conventional to oxidize glucose in a fuel cell.

h. Wherein said coating comprises activated carbon and acetylene black, as recited in claim 26.

Like Katsoulis, Kanbara teaches a current collector for an electrochemical device. Kanbara teaches producing an electrode by applying a paste including *activated carbon*, a binder resin such as fluororesin and an electrically conductive material such as *acetylene black* onto a current collector (col. 2, lines 27-34).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the coating described by Katsoulis with wherein said coating comprises activated carbon and acetylene black because these are conventional materials applied to a current collector to produce an electrode which is used in a liquid electrolyte as taught by Kanbara (col. 2, lines 27-34)

i. Wherein the organic molecules are glucose molecules, as recited in claim 29.

Like Katsoulis, Richter teaches an electrode for an fuel cell. Richter teaches oxidizing glucose with a platinum cobalt electrode in a bio-fuel cell (col. 7, Example 4; and col. 9, lines 30-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the organic molecules described by Katsoulis with wherein the organic molecules are glucose molecules because glucose would have been oxidized by a platinum cobalt electrode in a fuel cell as taught by with a (col. 7, Example 4; and col. 9, lines 30-40).

Furthermore, the selection of old parts to operate in new environments in order to achieve the same results was held to have been obvious. *In re Ross* 105 USPQ 237. And the substitution of known equivalent structures was held to have been obvious. *In re Ruff* 118 USPQ 343 (CCPA 1958).

III. Claims **29-30 and 33-39** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katsoulis et al.** (US Patent No. 3,668,014) in combination with **Nonaka et al.** (US Patent No. 5,536,379), **Richter et al.** (US Patent No. 4,126,934) and **Kanbara et al.** (US Patent No. 5,538,811).

Katsoulis, Nonaka, Richter and Kanbara are as applied for reasons as discussed above and incorporated herein.

The method of Katsoulis differs from the instant invention because Katsoulis does not disclose wherein the organic molecules are glucose molecules, as recited in claim 29.

Like Katsoulis, Richter teaches a fuel cell electrode. Richter teaches oxidizing glucose with a platinum-cobalt electrode in a bio-fuel cell (col. 7, Example 4; and col. 9, lines 30-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the organic molecules described by Katsoulis with wherein the organic molecules are glucose molecules because glucose molecules would have been oxidized in a fuel cell as taught by Richter Furthermore (col. 7, Example 4; and col. 9, lines 30-40).

Richter teaches that is conventional to oxidize glucose in a fuel cell.

IV. Claims **31 and 40-48** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Katsoulis et al.** (US Patent No. 3,668,014) in combination with **Nonaka et al.** (US

Patent No. 5,536,379), **Richter et al.** (US Patent No. 4,126,934) and **Kanbara et al.** (US Patent No. 5,538,811).

Katsoulis, Nonaka, Richter and Kanbara are as applied for reasons as discussed above and incorporated herein.

The method of Katsoulis differs from the instant invention because Katsoulis does not disclose wherein the organic molecules are glucose molecules, as recited in claim 31.

Like Katsoulis, Richter teaches a fuel cell electrode. Richter teaches oxidizing glucose with a platinum-cobalt electrode in a bio-fuel cell (col. 7, Example 4; and col. 9, lines 30-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the organic molecules described by Katsoulis with wherein the organic molecules are glucose molecules because glucose molecules would have been oxidized in a fuel cell as taught by Richter Furthermore (col. 7, Example 4; and col. 9, lines 30-40).

Richter teaches that is conventional to oxidize glucose in a fuel cell.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edna Wong
Primary Examiner
Art Unit 1753

EW
June 16, 2006